Ecology across borders

Embedding Ecology in Sustainable Development Goals

29 July - 2 August 2019, Lisbon, Portugal

15th EEF - European Ecological Federation Congress

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Assessing seed germination of Iberian endemisms to enhance plant conservation on linear infrastructures

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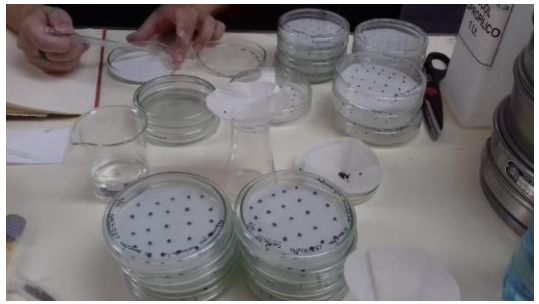
LIFELINES



Test, evaluate and disseminate mitigation measures

Promote the creation of a demonstrative Green Infrastructure

To mitigate negative effects of linear infrastructures and improve the local biodiversity

The **increasing number of roads** and other linear infrastructures cause

- ✓ Habitat fragmentation
- ✓ Edge effect
- ✓ Invasion of exotic species
- ✓ Soil erosion
- ✓ Pollution

The **roadside vegetation** is usually disturbed by:

Changes of soil

Seeding to prevent soil erosion

Air and water pollution

Management practices

One of the major driving factors of biodiversity loss

Positive aspects of road corridor:

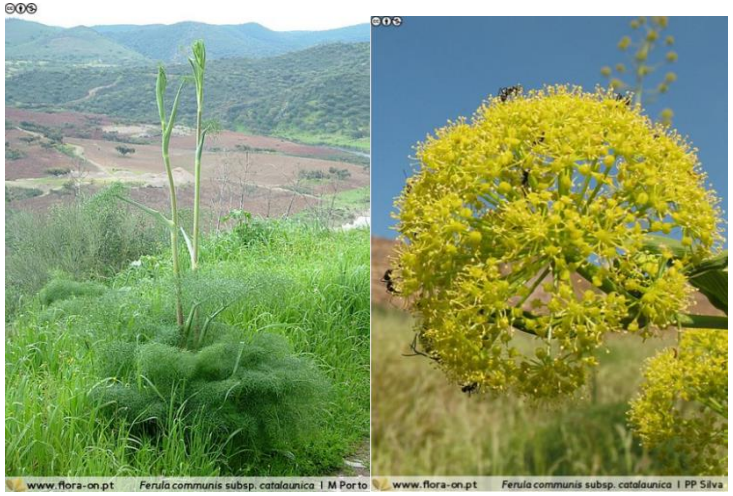
- ✓ Increase habitat connectivity
- ✓ Pools of biological diversity
- ✓ Refuge for native plant populations
- ✓ Habitat for wildlife fauna
- ✓ High seed dispersal capacity

A conservation tool to rescue and preserve native plants by seeding them in road corridors

Germination requirements for most of these species are **unknown**

Germination protocols for **6 Iberian endemisms** suitable to use for vegetation promotion at road corridors

Digitalis thapsi



Ferula communis* subsp. *catalaunica

Linaria amethystea* subsp. *amethystea

Pterocephalidium diandrum

Sanguisorba hybrida

Silene scabriflora* subsp. *scabriflora

Digitalis thapsi

Ferula communis* subsp. *catalaunica

Linaria amethystea* subsp. *amethystea

Pterocephalidium diandrum

Sanguisorba hybrida

Silene scabriflora* subsp. *scabriflora

Pre-treatment

No

All the species

Yes

Cold Stratification (17 days at 4ºC) → All the species

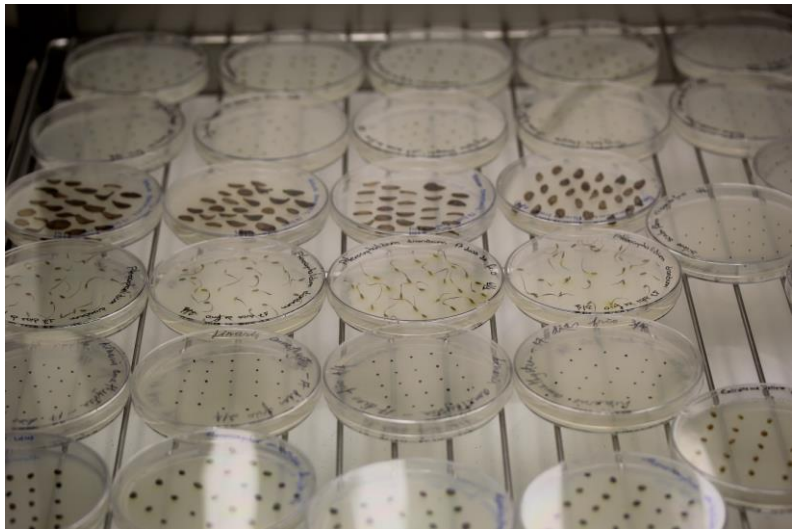
Scarification (cut of the seed coat) → *S. hybrida*, *P. diandrum*

Germination conditions

8h/16h at 15ºC/10ºC – Autumn

8h/16h at 15ºC/5ºC - Winter

12h/12h at 20/10ºC - Late Spring



21 days

General results

Species (seeds lot)	Viability % (mean ± SE)	Indication of dormancy	Maximum Germination % (mean ± SE)
Digitalis thapsi	98.00 ± 0.48	0.39	94.00 ± 1.15
Ferula communis	40.50 ± 2.25	0.25	56.73 ± 7.03
Linaria amethystea	94.33 ± 1.20	0.69	53.63 ± 1.58
Pterocephalidium diandrum (2017)	95.00 ± 1.46	0.59	86.00 ± 6.00
Pterocephalidium diandrum (2018)	64.00 ± 2.56	0.59	
Sanguisorba hybrida	87.83 ± 2.24	0.81	31.25 ± 3.00
Silene scabriflora	98.50 ± 0.53	0.18	86.00 ± 6.22

High seed viability

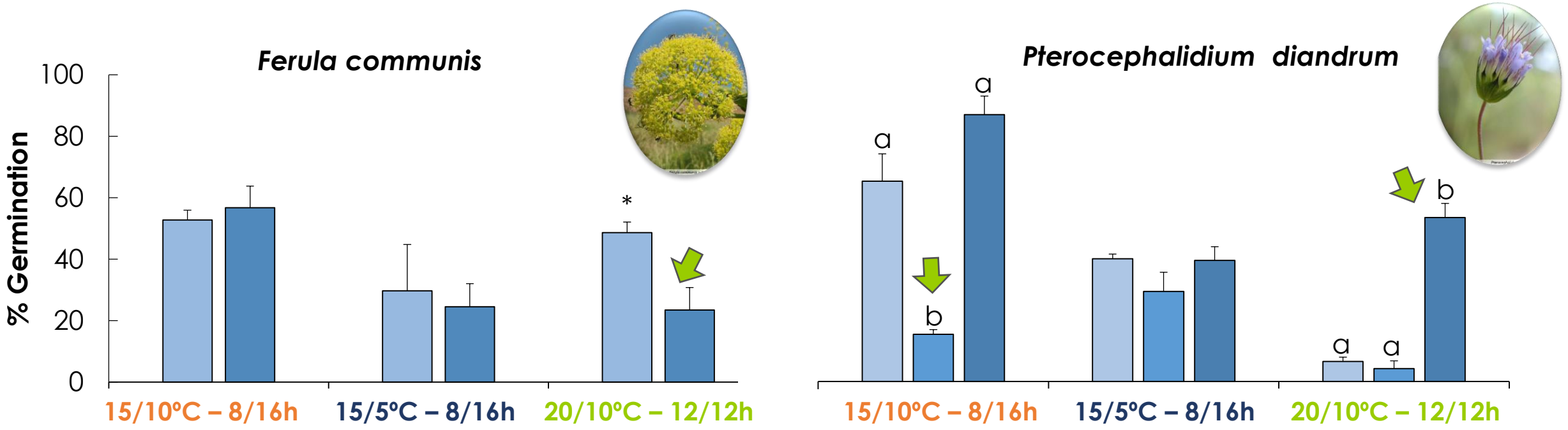
above 85% in the most cases

≥0.4 is a **dormancy indication**

High or medium seed germination

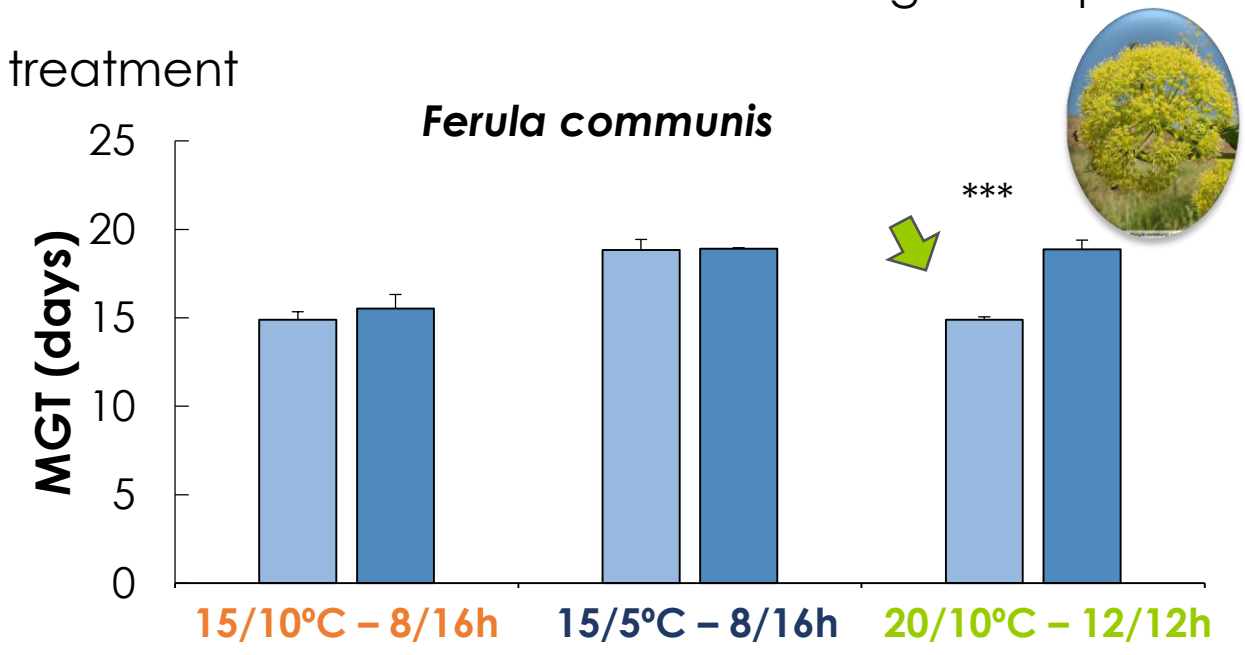
% Germination within each germination conditions:

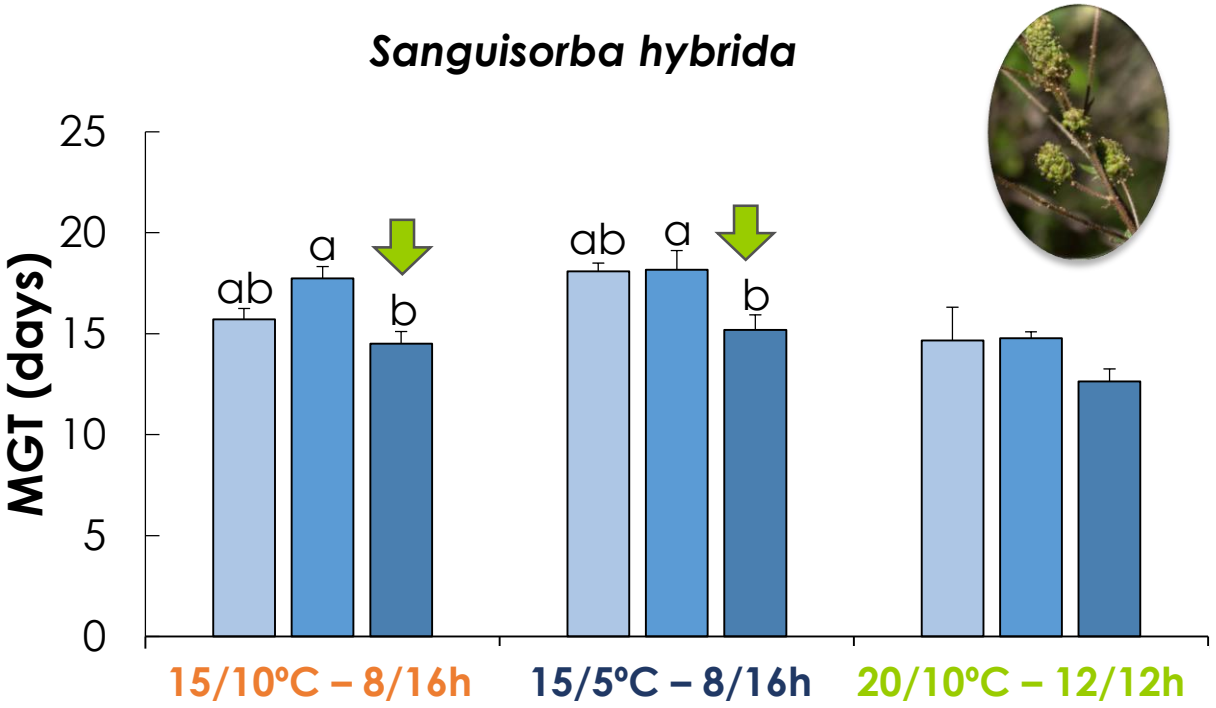
- **Most species** had a **similar germination rate** with or without pre-treatment
- The exceptions were *Ferula communis,* and *Pterocephalidium diandrum*

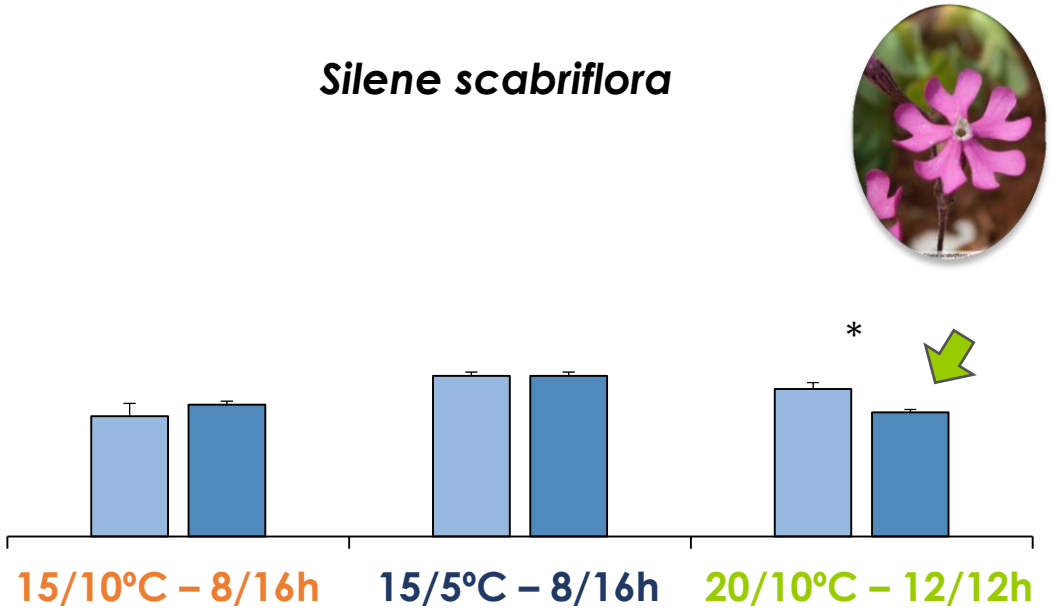


Mean Germination Time (MGT) within each germination conditions:

- ***D. thapsi*, *L. amethystea*,** and ***P. diandrum*** had **a similar MGT** with or without the pre-treatment
- ***F. communis*, *S. hybrida***, and ***S. scabriflora*** showed a **different MGT** according the pre-treatment







In summary:

- Within each germination conditions, most species had a **similar germination behavior with or without the pre-treatments tested**.

- Only **two species** had **favorable outcomes with a pre-treatment** when compared with the seeds without a pre-treatment**. At the late spring conditions**:
  - ***Pterocephalidium diandrum*** had a **better germination** with **scarification**
  - ***Silene scabriflora*** germinated **slightly faster** with **cold stratification**

No pre-treatment is necessary

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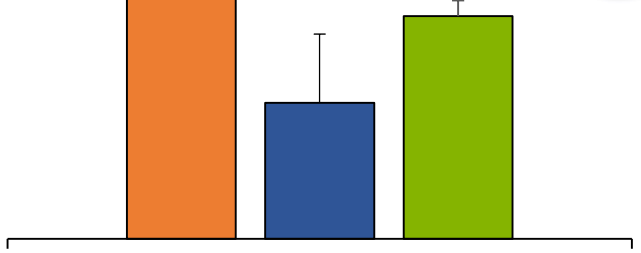
% Germination Without pre-treatment

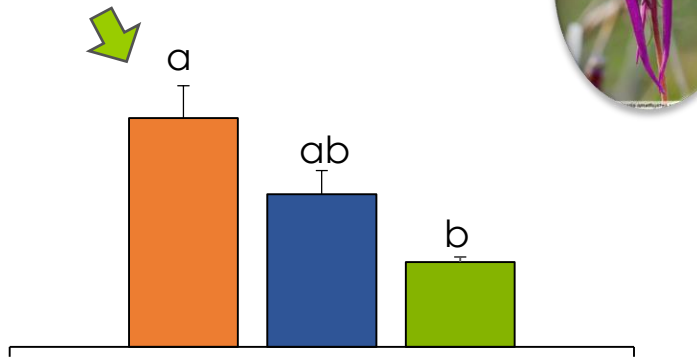
Autumn: 15/10°C - 8/16h
Winter: 15/5°C - 8/16h
Late Spring: 20/10°C - 12/12h

Digitalis thapsi

Ferula communis

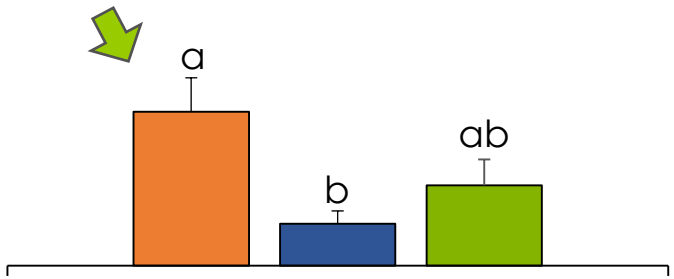


Linaria amethystea

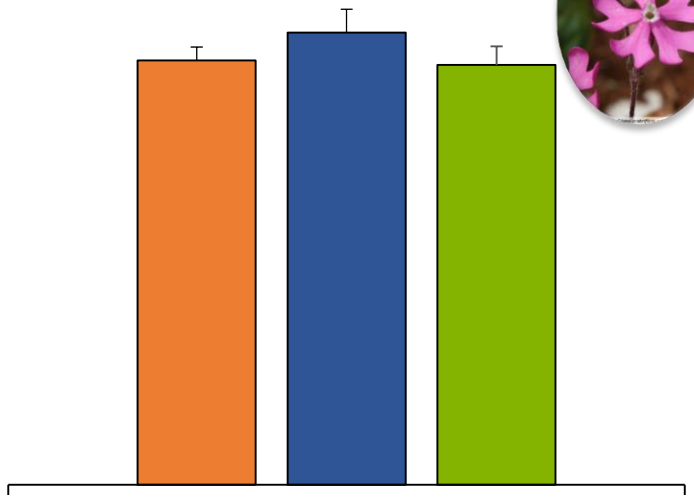


Pterocephalidium diandrum

Sanguisorba hybrida



Silene scabriflora



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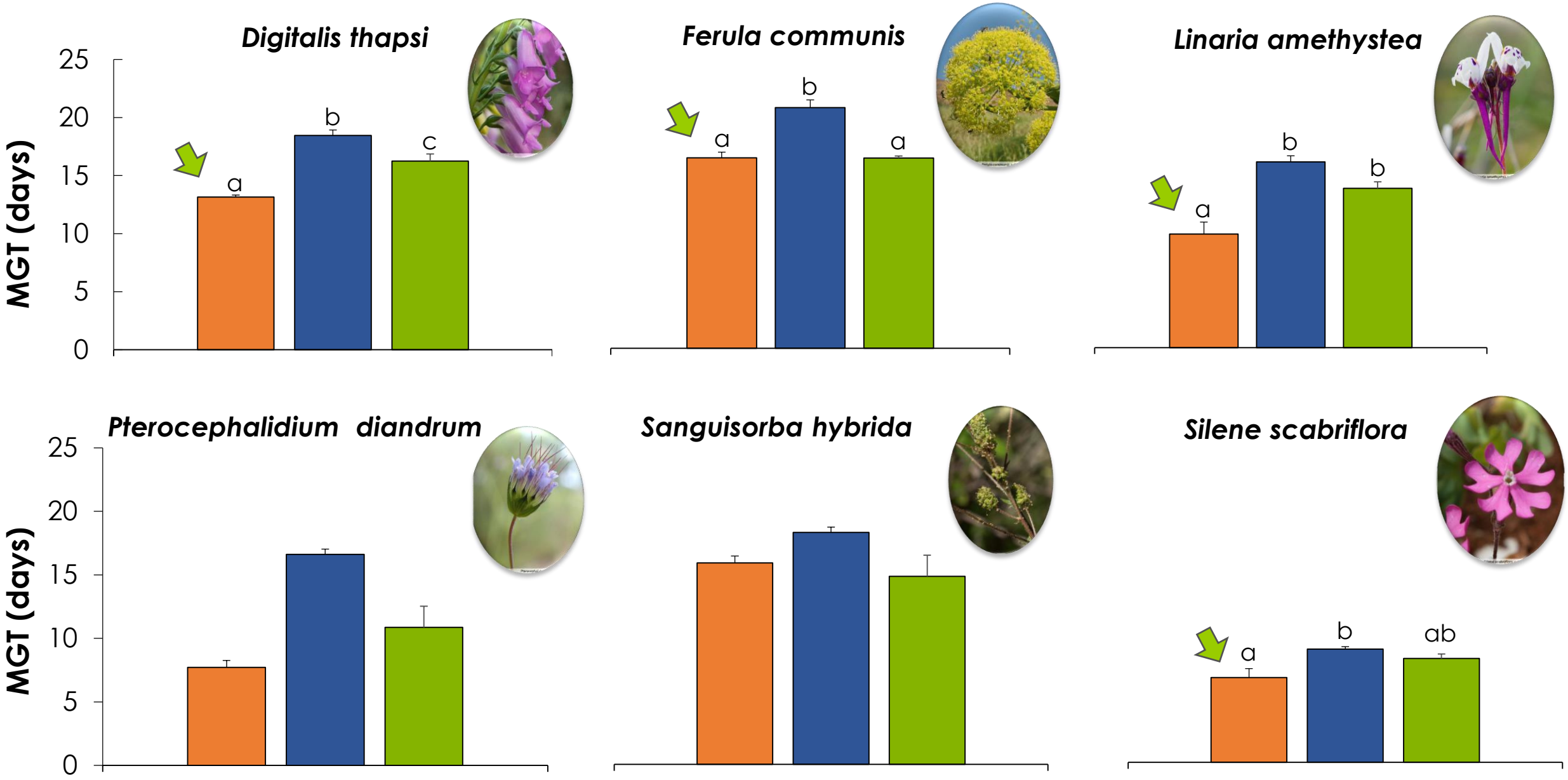
MGT
Without pre-treatment

Autumn ■ 15/10°C - 8/16h
Winter ■ 15/5°C - 8/16h
Late Spring ■ 20/10°C - 12/12h



Conclusion:

- ✓ **Seeds viability**
  - ✓ **High** – **suitable to be used** in conservation actions
  - ✓ **Medium** - **suitable to use** but with **seeds density adjustments**
- ✓ **Seeds dormancy**
  - ✓ **Without or lower** indication of dormancy

At autumn conditions (15/10ºC; 8/16 hours) and **without pre-treatment**:

- ✓ **All the species** reached their **better germination performance**
  - ✓ D. thapsi, S. scabriflora and P. diandrum - **high germination rates**
  - ✓ F. communis, L. amethystea and S. hybrida – medium germination rates
- ✓ **Faster germination** (MGT less than 16 days)

Species suitable to use for native plants reinforcement on linear infrastructures

Thank you for your attention!

LIFE LINES
Linear Infrastructure Networks with Ecological Solutions

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